

## Low-Cost Lidar for Wake-Vortex and Other Hazard Detection, Phase I

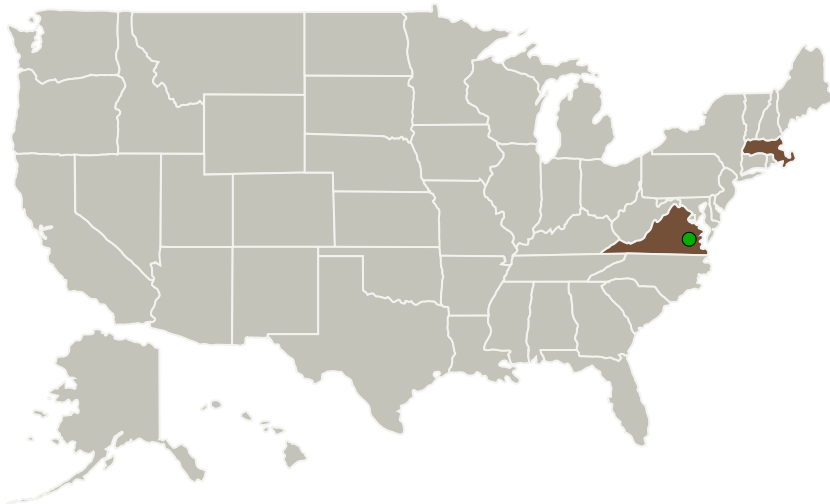


Completed Technology Project (2012 - 2012)

## Project Introduction

NASA has been tasked with supporting the development of key technologies to facilitate the evolution of the National Airspace System to NextGen, the Next Generation Air Transportation System. One of these key technologies is the detection of in-flight hazards, such as wake vortices generated by other aircraft, wind-shear, clear-air turbulence (CAT), and volcanic ash. All of these hazards can be detected by a laser radar (lidar) located on the aircraft, but such a system needs to be light, small, and inexpensive, and also needs to be sufficiently rugged that it will continue functioning with minimal maintenance. This mandates that the lidar be simple because such systems 1)cost less because they have fewer components and are easier to assemble and align 2)are more rugged and reliable because they have fewer components that can individually fail and 3)are less susceptible to environmental factors such as vibration, temperature variations, and pressure changes. We propose to develop an intrinsically simple, innovative, low-cost coherent lidar that would be suitable for deployment in large numbers on commercial airliners. The Phase I effort will also include a modeling task to explore how a single lidar could be used to detect all of the hazards listed above. We will evaluate potential modifications in light of our desire to keep the system as simple as possible. We will also compare the benefits of using a coherent lidar to detect volcanic ash, in contrast to a more conventional incoherent system.

## Primary U.S. Work Locations and Key Partners



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## Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Project Transitions	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	3
Technology Areas	3
Target Destinations	3

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Organizations Performing Work	Role	Type	Location
Q-Peak, Inc.	Lead Organization	Industry	Bedford, Massachusetts
● Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

## Primary U.S. Work Locations

Massachusetts	Virginia
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## Project Transitions

**February 2012:** Project Start**August 2012:** Closed out**Closeout Documentation:**

- Final Summary Chart(<https://techport.nasa.gov/file/140251>)

## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Organization:**

Q-Peak, Inc.

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

Carlos Torrez

**Principal Investigator:**

John H Flint

**Co-Investigator:**

John Flint

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## Technology Maturity (TRL)

Start: **3**  
Current: **4**  
Estimated End: **4**



## Technology Areas

### Primary:

- TX16 Air Traffic Management and Range Tracking Systems
  - TX16.2 Weather/Environment

## Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System